

DESCRIPTION**Drive and quick stop for a weapon with preferably
linear breech or ammunition feed**

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Various drives, such as external drives or self-drives, for weapon systems are known from the prior art. Electrical drives are frequently provided for external drives, and these then, for example, drive a chain. One
10 known chain drive is used in the machine gun known by the name Bushmaster or else chain gun. In this case, the times during which the breech has to be stationary for closing it, in order to fire the shot, in order to open the breech and to place a cartridge in front of
15 the breech, are implemented by a revolving chain which is driven by a motor ([http://de.wikipedia.org/wiki/M242 Bushmaster](http://de.wikipedia.org/wiki/M242_Bushmaster)). In this case, the breech, together with the round or cartridge in front of it, is fed linearly to the cartridge chamber.

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DE 10 2006 022 622 A1 describes a linear feed for the round into a weapon barrel or cartridge chamber, which feed has a control guide, which is used for function control, on the horizontal plane parallel to the
25 movement of a breech, which has to be guided linearly, for the breech-loading weapon. This functionally interacts with a so-called drive guide, which is likewise located on the horizontal plane, for guiding a means connected to the breech. The drive guide is
30 integrated in a movable slider, which is itself moved by a universally configurable drive. Furthermore, a locking guide is provided for locking the breech, and is preferably integrated in the movable slider together with the drive guide. A bolt on a locking ring, which
35 is preferably arranged on the weapon side, can engage in this locking guide. This bolt then itself moves the locking ring. Within the control guide and the drive guide, which interact with one another, a connecting rod

or the like is positively guided by the guides and the slider along these guides. The breech is moved backward and forward by means of this connecting rod.

5 Building on this, DE 10 2007 048 468.4, which was not published prior to this, considers in more detail a drive for the linear feed of the round into a weapon barrel or cartridge chamber by means of a chain. The chain itself is passed in a simple manner closely
10 around two sprocket wheels. A chain link or a stud on the chain is integrated in a guide or groove which is located underneath the movable slider. This allows the chain to continue to run during the times in which the weapon is stationary, and which is defined by the
15 function control. The chain itself can be driven by an electric motor.

Since, in the case of an external drive, the breech movements take place independently of the gas pressure
20 in the weapon barrel, it is necessary to prevent the breech from being opened in the event of a misfire (the propellant charge in the cartridge does not burn away after the firing energy has been supplied) or a late fire (in this case the propellant charge burns away
25 with a considerable time delay). In general, the gas pressure or the weapon barrel itself is for this purpose detected as an indication of correct burn-away. If this information is lacking, a so-called quick stop must be initiated, and the opening of the breech must
30 be prevented.

The mass forces during breaking of the external drive, in order to prevent opening, result in high loads in or on the elements of the drive train, particularly at
35 relatively high firing rates.

DE 10 2007 048 470.6, which was not published prior to this, deals with the problem of a so-called quick stop

in externally driven weapons. The quick stop is inserted all the time, and is moved out again when a shot is fired correctly. However, in the event of a misfire, a means which is functionally connected to the
5 weapon recoil runs onto the quick stop, the drive movement is stopped, and the breech is not unlocked, at least for a predeterminable time.

DE 30 21 200 C2 discloses a protection system against
10 late firing or subsequent firing. In addition to having a sensor for detection of recoil, the weapon is equipped with a quick stop which can be moved to a position pushed in with respect to the chain part, in order to stop a normally continuously moving chain
15 part, and therefore to stop the movement of the breech. A locking apparatus which responds to the sensor controls the movement of the stopping apparatus between the pushed-in position, in which the chain part is stopped, and an extended position, in which the
20 movement of the chain part is otherwise not impeded. The protection system has two elements, which are connected to the chain part, a main element and a safety element, as well as a trigger rod which is controlled by a solenoid, and a recoil push rod. The
25 recoil push rod is used to release a recoil catch bolt when the shot is fired, the trigger rod is used to move the safety element down when the weapon is locked and to release it when the round has been correctly fired. In order to subsequently stop the weapon, the trigger
30 rod acts on the main element, since the solenoid is switched off. However, an electrically controlled solenoid such as this is particularly undesirable in safety devices of this type because it is itself susceptible to defects. The possibility of the material
35 of the rods fracturing furthermore means that the safety device is not functionally reliable. In addition, the design of the entire unit is very complex.

DE 32 18 550 C2 discloses a blocking device for a machine gun having an externally driven breech drive. In this case, energy which results from the shot firing is used for a shot monitoring device to interrupt the external power supply. When a shot is not fired and there is no return movement, this prevents a control stud of the device from being moved out of a pulled-back position to a driving position, while a switching lever is transported by an interrupter stud to a position in which the power supply is continuously restricted. The disadvantage of this solution is likewise the high level of design complexity, and the weight associated with this.

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The purpose of the invention is to specify a drive for feeding the weapon breech to the cartridge chamber, in which the breech is automatically decoupled from the drive, particularly in the event of a misfire or a late fire.

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The object is achieved by the features of patent claim 1. Advantageous embodiments are listed in the dependent claims.

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The invention is likewise based on the idea of integrating a chain as a drive. The rotary movement of the external drive, for example an electric motor, is converted via the chain drive to a forward and backward movement of the breech. The chain has at least two driver studs. In order to allow the times for which the breech is stationary in the limit positions, the breech is disconnected from the driver studs, and therefore from the drive, in its front and rear positions.

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The sprocket wheels which drive the chain themselves have a radius which accelerates or brakes the breech on

the basis of a sinusoidal function which is produced in this way.

The at least two driver studs on the chain engage in a
5 slide with a groove under the breech or the breech holder, in order to drive it. In the times when the breech is stationary, the driver studs each leave the groove. The slide itself is introduced into a guide under the breech and can be moved in this guide. It is
10 preferably only half as wide as the chain drive. In this case, the slide occupies only a part of the overall guide, and can therefore be moved to and fro in this guide transversely with respect to the firing direction. The slide is pressed by a spring or the like
15 against the right-hand side, in the firing direction, of the breech or the breech holder, such that one driver stud on the chain engages in the groove in the slide on its forward path in the firing direction. As the chain drive continues to run, this driver stud on
20 the chain moves back again on the left-hand side of the weapon system and in the process leaves the groove in the slide, as a result of which the breech remains in its foremost, locked position, independently of the drive. After a shot has been fired, the slide itself is
25 moved from its right-hand position (seen in the firing direction) to its left-hand position within the guide. This is done using weapon recoil or, alternatively, gas pressure. This means that the weapon recoil which follows the firing of the cartridge moves the slide to
30 the left-hand side of the breech or of the weapon system, where it is held by a lever etc. The second driver stud on the chain is now itself moved from the right-hand side into the groove in the slide, and drives the breech to its rear position. Here, the
35 driver stud leaves the groove again, thus starting the rear waiting time of the breech. When the cartridge is placed in front of the breech by a feed or the like, the slide is forced to the right-hand side again, under

the breech, by releasing the (hold-down) lever from the spring. The next driver stud on the chain is now moved from the left-hand side into the groove in the slide, and drives the entire system forward again. If no shot
5 is fired, the slide remains in its right-hand position, and the second or subsequent driver stud cannot unlock the breech, and move it back.

The invention will be explained in more detail using
10 one exemplary embodiment and with reference to the drawing, in which:

Figure 1 shows a slightly perspective illustration of
a drive for an externally driven weapon,
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Figure 2 shows a side view of figure 1,

Figure 3 shows a view from the left, with the major
assemblies,
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Figure 4 shows a view from below, with the major
assemblies.

Figure 1 shows an illustration of a breech drive with a
25 chain 6 for an externally driven machine gun (partially illustrated), with a weapon barrel 1 which is mounted in a barrel lock 2 (in this case a locking bush), in which a breech 3 is also locked in its front position. The breech 3 can be moved on breech guides 4 in and
30 counter to the weapon barrel axis.

Two sprocket wheels 5 and the chain 6 with preferably
two driver studs 7 are preferably arranged underneath
the breech guides 4 or the breech 3 (offset by 180°
35 with respect to one another). A slide 8 is mounted in a guide at the bottom on the breech 3 (or breech holder) such that it can be moved transversely with respect to the firing direction, and a groove 9 extends over the

entire width of this slide 8. Via this groove 9, the respective driver stud 7 moves the breech 3 forward in the firing direction, or back after the shot.

- 5 One of the sprocket wheels 5 is driven by a motor or the like (directly or indirectly), and drives the chain 6 such that the chain 6 is moved forward on the right-hand side of the weapon, and back on the left-hand side, seen in the firing direction. Alternatively, the
10 entire movement can also take place in the opposite direction to this described direction.

In order to transport the breech 3 forward, the driver stud 7 located on the right-hand weapon side is
15 threaded into the groove 9 of the slide 11. This results in an interlocking connection, in the longitudinal direction of the weapon, between the drive 2 and the breech 3, with the breech 3 being accelerated or braked via a sinusoidal function, which is
20 predetermined by the radius of the sprocket wheels 5.

The times in which the breech 3 is stationary in the front limit position are implemented in that the driver stud 7 is moved out of the groove 9 and is moved
25 backward on the left-hand side of the weapon without the breech 3. When the breech 3 is in the front, locked position, a firing bolt (not illustrated in any more detail) is released in a known manner, by which means a cartridge located in the cartridge chamber (neither is
30 illustrated in any more detail) is fired. The weapon recoil which then occurs is used to move the slide 8 to the left-hand side of the weapon. Alternatives which use the build-up of gas pressure on firing are possible.

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The elements 10 to 15 which are required for operation are shown by way of example in figures 2 to 4, in

particular taking account of the possible use of gas pressure.

5 A lever 10 moves the slide 8 to its left-hand position, and in the process stresses a compression spring 16, during the weapon recoil. The recoil movement is transmitted from the weapon barrel 1 to the barrel lock 2, which drives a pin 13. The pin 13 and a plunger 12 are arranged in a bearing block 11, which is fixed to
10 the weapon housing, such that they can be moved in the longitudinal direction. Figure 3 shows a spring between a sleeve, in which the pin 13 is mounted, and the plunger 12. The weapon recoil is therefore not converted in a rigidly coupled form to a rotary
15 movement of the lever 10, but instead is buffered via the spring. This therefore ensures that the slide 8 is always moved completely onto the left-hand side, even when weapon recoils of different length occur.

20 During weapon recoil, a linkage 15 is moved by the rear edge of the barrel lock 2 and rotates the lever 10, thus removing the lock from the slide 8, which holds (locks) the slide 8 in its right-hand or left-hand position, by means of a tap, when in its rest position.
25 After the weapon barrel has recoiled (shot fired), the slide 8 is now located on the left-hand side of the weapon and is held in this position by the lever 10, against the pressure from the spring 16. The next driver stud 7 now runs from the right-hand side into
30 the groove 9, and drives the breech 3 to its rear position. In this position, the stud 7 leaves the groove 9, as a result of which the breech 3 is once again detached from the drive 6 (2), and remains in its position.

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After a new cartridge has been fed upstream of the breech 3, an element of the feeder (not illustrated in any more detail), for example, actuates the lever 14,

as a result of which the locking of the slide 8 is canceled. The slide 8 is then moved by the spring 16 back to the right-hand side of the weapon, as a result of which the next driver stud 7 drives the breech 3 forward again.

However, if there is no weapon recoil, because no shot has been fired, the slide 8 remains in the front position on the right-hand side of the weapon, and the second or subsequent driver stud 7 cannot unlock the breech 3 and drive it back.

Claims:

1. A drive provided with a quick stop device operably connected to a breech, or a breech support, of a weapon, wherein the breech or breech support is moveable between a front limit position and a rear position in an axial direction with respect to a weapon barrel of the weapon, wherein the drive comprises:

- (a) a motor;
- (b) a chain that is driven by the motor and to which at least two driver studs are fitted;
- (c) at least two sprocket wheels arranged underneath the breech, wherein the chain with the at least two driver studs is passed around the at least two sprocket wheels;
- (d) a slide mounted in a guide disposed at a bottom on the breech, or at a bottom on the breech support, so that the slide is moveable transversely with respect to a firing direction, and a groove extends over the entire width of the slide, wherein a respective one of

the at least two driver studs moves the breech via the groove either forward in the firing direction or backward after a shot is fired, wherein during

times in which the breech is stationary in the front limit position, the driver stud that transports the breech forward is moved out of the groove and the driver stud is moved backward on a first weapon side and without the breech, and

when a shot has been fired, the slide moves to the first weapon side, and when no shot has been fired, the slide remains in a first position in which the slide has been moved away from the driver stud so that neither driver stud is in position to drive the breech to the rear position.

2. The drive as claimed in claim 1, wherein one of the at least two sprocket wheels is driven by the motor, either directly or indirectly, and the one sprocket wheel driven by the motor drives the chain.

3. The drive as claimed in claim 1, wherein the breech is accelerated or braked in accordance with movement defined by a sinusoidal function, wherein the sinusoidal function is predetermined by a radius of the at least two sprocket wheels.

4. The drive as claimed in claim 1, wherein a lever moves the slide to a left-hand position, and in the process of moving the slide to the left-hand position the lever stresses a compression spring.

5. The drive as claimed in claim 1, wherein a recoil movement of the weapon barrel acts on a barrel lock of the weapon so that the barrel lock drives a pin that is arranged to be moveable in a longitudinal direction, together with a plunger, in a bearing block that is fixed to a weapon housing.

6. The drive as claimed in claim 5, wherein a spring is included between a sleeve and the plunger, wherein the pin is mounted in the sleeve.

7. The drive as claimed in claim 5, wherein a linkage is moved by a rear edge of the barrel lock during weapon recoil, and the linkage rotates the lever thus removing a lock from the slide that holds the slide in a right-hand position or a left-hand position, in a rest position, by means of a tab.

8. The drive as claimed in claim 2, wherein the breech is accelerated or braked in accordance with movement defined by a sinusoidal function, wherein the sinusoidal function is predetermined by a radius of the at least two sprocket wheels.

9. The drive as claimed in claim 8, wherein a lever moves the slide to a left-hand position, and in the process of moving the slide to the left-hand position the lever stresses a compression spring.

10. The drive as claimed in claim 2, wherein a lever moves the slide to a left-hand position, and in the process of moving the slide to the left-hand position the lever stresses a compression spring.

11. The drive as claimed in claim 3, wherein a lever moves the slide to a left-hand position, and in the process of moving the slide to the left-hand position the lever stresses a compression spring.

12. The drive as claimed in claim 6, wherein a linkage is moved by a rear edge of the barrel lock during weapon recoil, and the linkage rotates the lever thus removing a lock from the slide that holds the slide in a right-hand position or a left-hand position, in a rest position, by means of a tab.